Renewable energy financing; Examples from UNEP projects

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Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

UNEP Renewable Energy Financing Examples

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Regional Workshop on Renewable Energy in the Carpathians

Jyoti Prasad Painuly

May 6-7, 2008

Lviv Ukraine

- PROSOL presentation Eric Usher, DTIE, UNEP
- Montengero presentation Myriem Touhami DTIE, UNEP Paris

RISØ

UNEP Risøe Centre – Energy, Climate and Sustainable Development

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ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

International and Danish research team of 23 economists and scientists.

Based on agreement between Risø, UNEP and Danida.
Located at Risø since 1990.

URC Activities 2005 - 6

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Three Key Themes

- Energy Policy
- Energy and Carb Finance
- Sustainable Development and Climate Change

Activity areas

- Energy & Poverty
- Energy Efficiency & Renewable Energy
- Energy Sector Reform
- CDM & Carbon markets
- Development & Climate
- National and International Policy Instruments
- Transport
- Capacity Building

PV Solar Home Systems Loan Programme in India

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- End User Financing Models; PV-SHS

- Supplier credit model
  E.g. in Indonesia
- consumer credit (or micro-credit) model
  Eg. in Bangladesh (Grameen Shakti),
  India (UNEP PV SHS) and SriLanka (WB)
- Fee-for-service model
  Eg. South Africa Rural Electrification Program,
  The Tuvalu Solar Electric Cooperative
- Leasing model
  Eg. SOLUZ Dominicana

Project partners and Project Management Structure

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- **Two banks-** Canara and Syndicate (and their Grameen Banks)
- UNEP and URC
- Crestar Capital, Mumbai (Project Management-India)
- Vendors

Salient Features of UNEP Programme

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- **Extensive Stakeholder Consultation at Programme Design Stage; Access to Credit, Awareness, Others**

- **Access to Credit**
  - **Risk perception**
    - **Technical Support**
      - **Product specification**
      - **Vendor qualification**
    - **Financial support**
      - **Transaction cost support**
      - **Interest Subsidy as a marketing tool, with sunset provision**

Salient Features of UNEP Programme

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- **Awareness**
  - Village meetings
  - Other measures
- **Other Features**
  - Systems and procedures: within existing system- no tinkering
  - Open to ideas and suggestions
    - Reaching urban poor through entrepreneurs (Selco-S3IDF projects)
    - Grameen Banks
    - Technical support to other Banks

Programme Monitoring

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- **Audit**
- **Best practices**
- **Customer satisfaction survey**
- **Field visits**
- **Interaction with vendors**

THE PROBLEM

The Customer

Who are we helping?

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- **15% of villages** did not have a power line

  ……Only 31% in electrified villages were connected

- Households face **power shortages**

  ……most are in rural areas

- **Solar home systems** can light up homes

  ……since they have no other reliable source of power

THE SOLUTION

Market Gaps

Solutions to market transformation

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1 Encourage Banks to lend

- Banks have money, rural branches, but are apprehensive that solar lighting technologies may be unviable

2 Improve financial capacity of buyer

- Small rural homes need innovative consumer loans

3 Build a commercial model

- Sustainability hinges on using free market forces and limiting external financial support

1 Credit Delivery

Encourage Banks to Lend

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Partnerships with local banks

Sensitise them to the **business potential**

- Structure a **loan product**
- Facilitate **Implementation**

- **Canara** and **Syndicate** are among **India's top banks**

…..National banks, very strong regional rural business

……..Control 8 local Grameen Banks

Run 2,000 branches in Karnataka

Canara Bank Syndicate Bank Malaprabha Grameen Tungabhadra Grameen
Sahyadri Grameen Chitradurga Grameen Kolar Grameen Nethravathi Grameen
Varada Grameen Bijapur Grameen

Mainstream lending for solar products

2 Structuring the Loan Product

Improve the Financial Capacity of the Borrower

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- Borrower pays **less upfront**
  - •15% down payment instead of 25%
- Loan is for **longer period**
  - •5 year term instead of 3 years
- **Interest** cost is low
  - •Initially 5% (back-ended), with subsidy phasing out over time to commercial rate of 12%
- **Small Loan** size
  - limited to Rs. 25,000, suits needs of small households
- **Easy access**
  - •Borrower walks to his neighborhood bank for a loan

3 Building a Commercial Model

Tender Approach Vs Finance Subsidy Approach

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- **Demand driven**
  - – **Consumer** demand for product, **business** drivers for the Banks
- **Free Pricing**
  - – multiple vendors use **competitive** tactics to win customers
- **Financial Incentive**
  - – interest subsidies improve affordability, **excite** customer
- **Replication**
  - – get **more** vendors, banks and customers in

Milestones

Taking stock after launch in Summer 2003

- Over **18,000 Solar Home Systems** Loans disbursed

  …….product popular, market penetration higher, overall sales multiply

- Banks' **Confidence** in lending for solar lights improves

  ……Several other banks now lending, UNEP banks lose market share

- Interest rate **subsidies** have progressively tapered off

  ……..Current rate of interest matched to normal rates

- Solar is now a commercial **rural electrification** solution

  ……..Several villages are switching on solar lights with the help of loans

Lessons Learned

What has been proved

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- Solar lighting systems are expensive

  ……**But** credit can make them accessible to rural households

- **Mainstreaming** the product is important

  ……**Free market** forces should not be shackled

  ……progressive phasing out of external support

- Non-economic factors impact a bank's decision to scale-up lending

……although they do not really change the underlying economics of solar home systems, finance subsidies can be useful in motivating banks

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- More info; http://uneprisoe.org/ and
- http://www.unep.fr/energy/act/fin/india/index.htm

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Example Programme Targeting the Provision of "End-User Finance to Scale up Markets"

PROSOL, a Tunisian Success Story

PROSOL (Solar Programme)

- Aim: to **create a long-term market** for solar thermal
- Different components
  - Finance
  - Capacity building
  - Awareness raising
- Two-year project launched in 2005 in Tunisia
  - Italian Ministry for the Environment, Land and Sea
  - National Agency for Energy Conservation – ANME
  - National electricity utility (STEG)
  - State-owned bank and commercial banks
  - Solar water heater suppliers
  - Carbon finance

Background analysis - Tunisia

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Favourable conditions

- High irradiation rates
- Scant fossil reserves
- Technical expertise & infrastructure
  - GEF programme (1997-2001)
- Energy conservation is a national priority

Challenges

- Conventional sources subsidised:
  - LPG boilers dominate the market (78%)
- SWH heavily dependent on incentives
- Incentives intermittent
- Cash-based market

- Key issues:
  - Develop a self-sustaining market
  - Need to engage the financial sector

⇒ Multi-stakeholder approach

Main features of the financial scheme

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- A **loan mechanism** over a 5-year term and repayments through utility bills
- A **capital cost subsidy** for each SWH provided by the Tunisian Govt (56 euro/m^2)
- **Discounted interest rates** on the loans
  - Interest rates lowered from 13% to 7% due to State Utility Involvement
  - Interest Rate Subsidy Facility, progressively phased out

SWH Loan Facility - What it does

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- **Buy CHEAP and Pay SLOWLY**

SWH Size	**200 liters**	**300 liters**
Net Cost of SWH	USD 825	USD 1075
Monthly payment (5 yrs)	USD 9	USD 11.5

A Quick and Simplified Procedure

- Customer contacts the SWH supplier
- Customer fills out the application form at **the SWH supplier office**, presents his latest STEG bill and ID
- The installation is **immediate** once the application form and engagement form are signed

PROSOL Results: Surface installed

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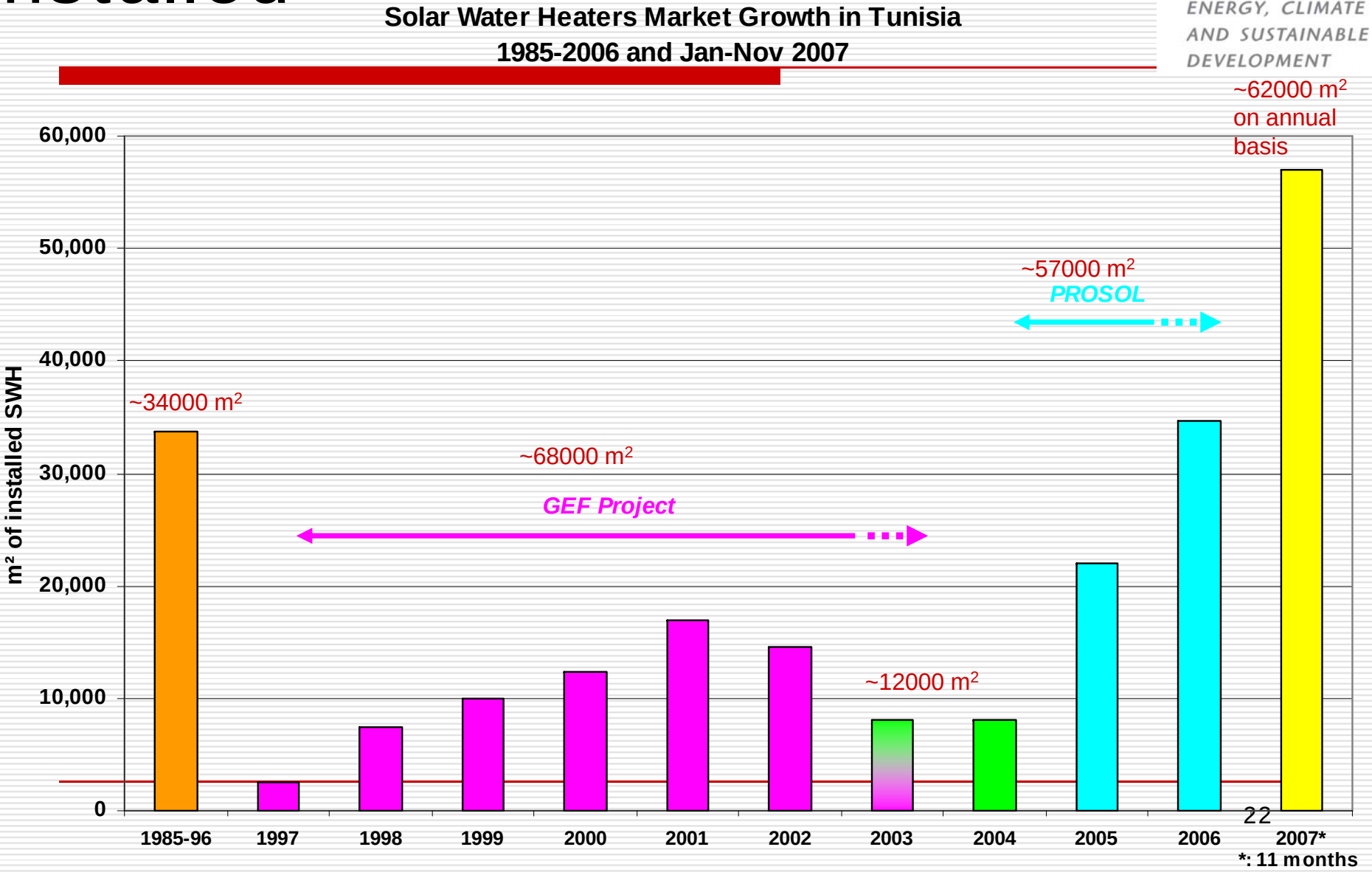
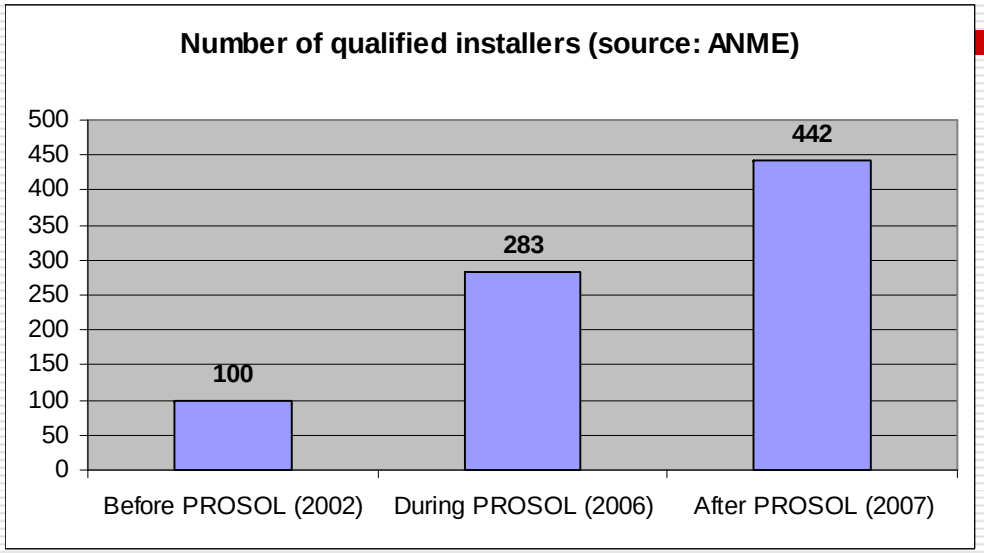
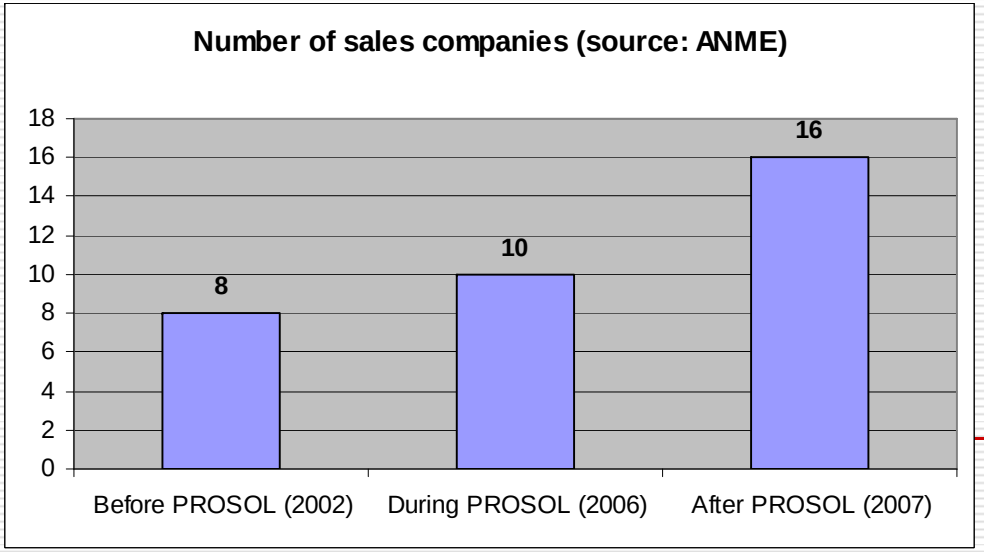


PROSOL Results: Social/Economic





- Approximately **300 new jobs** have been created
  - Particularly important, since in Tunisia the **unemployment rate is 14%** (National Statistics Institute, 2004)

Key success factors in PROSOL

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- Involvement of the Energy State Utility STEG offered security to banks
- A comprehensive communication and awareness raising campaign
- UNEP-MEDREP interest rate subsidy
  - Interest rate **down to 0 %** using UNEP-MEDREP funds
  - Phased out in 2006 with no impact on sales

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Solar Thermal Programme Proposal for Montenegro

Montenegrin Energy Market

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- Average energy needed in Podgorica per household to heat up water : 2960 kWh/year
- Average electricity price: 4.85c€/kWh
- Electricity as main source of water heating
- Montenegro's state-run power utility company: Elektroprivreda Crne Gore (EPCG)
- In 2008, Montenegro expected to Import 841,529 MWh Electricity for 70.6 Mln Euro (EPCG, December 2007)

Background analysis - Montenegro

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Favourable conditions

- ✓ Solar irradiation levels among the highest in Europe
- ✓ Important imports of energy
- ✓ Rising fuel prices
- ✓ Skilled manpower in Montenegro
- ✓ Implementation of the European Directive on Electricity Production from RE sources

Challenges

- ✗ Low electricity prices
- ✗ High solar thermal systems prices
- ✗ Lack of local manufacturers
- ✗ Need for awareness raising
- ✗ High interest rates
- ✗ Soft market development barriers

- Key issues:
  - Develop a self-sustaining market
  - Need to engage the financial sector

⇒ Multi-stakeholder approach

Cost of Equipment (Montenegro)

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- Estimated Price of equipment *

Type	**Thermosyphon**
Collector	**2.4 m²**
Storage Tank	**150 Litres**
Price in €/m², installation included	**365**
Total price in €, installation included	**875**

* Used an average of the prices in Greece, Cyprus, Tunisia and Italy

Customer loans in Montenegro

	Consumer Cash Loans
CKB	€ 1500
	3 to 5 years
	12%
Opportunity Bank	€ 500 - € 5,000
	Up to 36 Months
	12%-15%
Podgoricka Bank Societe Generale Group	€1000 - €5000
	3 to 5 years
	10%- 12%

The interest rates figures are estimates based on telephone conversations

Financial support mechanism: 1st Option

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- **State Utility mechanism**
  - Involvement of Energy State Utilities offers **security**
  - Banks **trust** Utility and Interest rates are negotiated
- A **loan mechanism** over 7 yrs repayments
  - Monthly repayments through utility bills
- **Discounted interest rates** on the loans
  - Interest rates lowered from 12% to 6% due to State Utility involvement
  - Interest Rate Subsidy Facility, 2 years at **0%** interest
- A Facility of € **500 000** will allow the installation:
  - **15 000 m²**, the equivalent of 6250 households

Financial support mechanism: 2nd Option

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- A **loan mechanism** over 5 yrs by local banks
- A **capital cost subsidy** for each SWH provided by the Italian Fund (**10 %** of system cost)
- **Discounted interest rates** on the loans
  - Interest Rate Subsidy, 1 year at **0 %** interest
- A Facility of € **500 000** will allow the installation of
  - **8 000 m²**, the equivalent of 3250 households

Carbon mitigation

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- Over its life, each SWH in Montenegro avoids:
  - **7.5 tonnes of CO2**
  - about **5** years of a medium size car emissions
- The SWH to be installed will avoid:
  - Over **200,000 tonnes** of **CO2**
  - Worth USD 3 million at market prices
- Development of CDM mechanism,
  - PINN
  - PDD
  - Registration

Suggested support activities

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For the amount of € 100 000

- **Technical support** for setting up financial mechanism
- A comprehensive **communication and awareness raising** campaign
- **Loan officer** training
- **SWH Supplier** Training
- Technical support for setting up a **small scale CDM project**

Next steps

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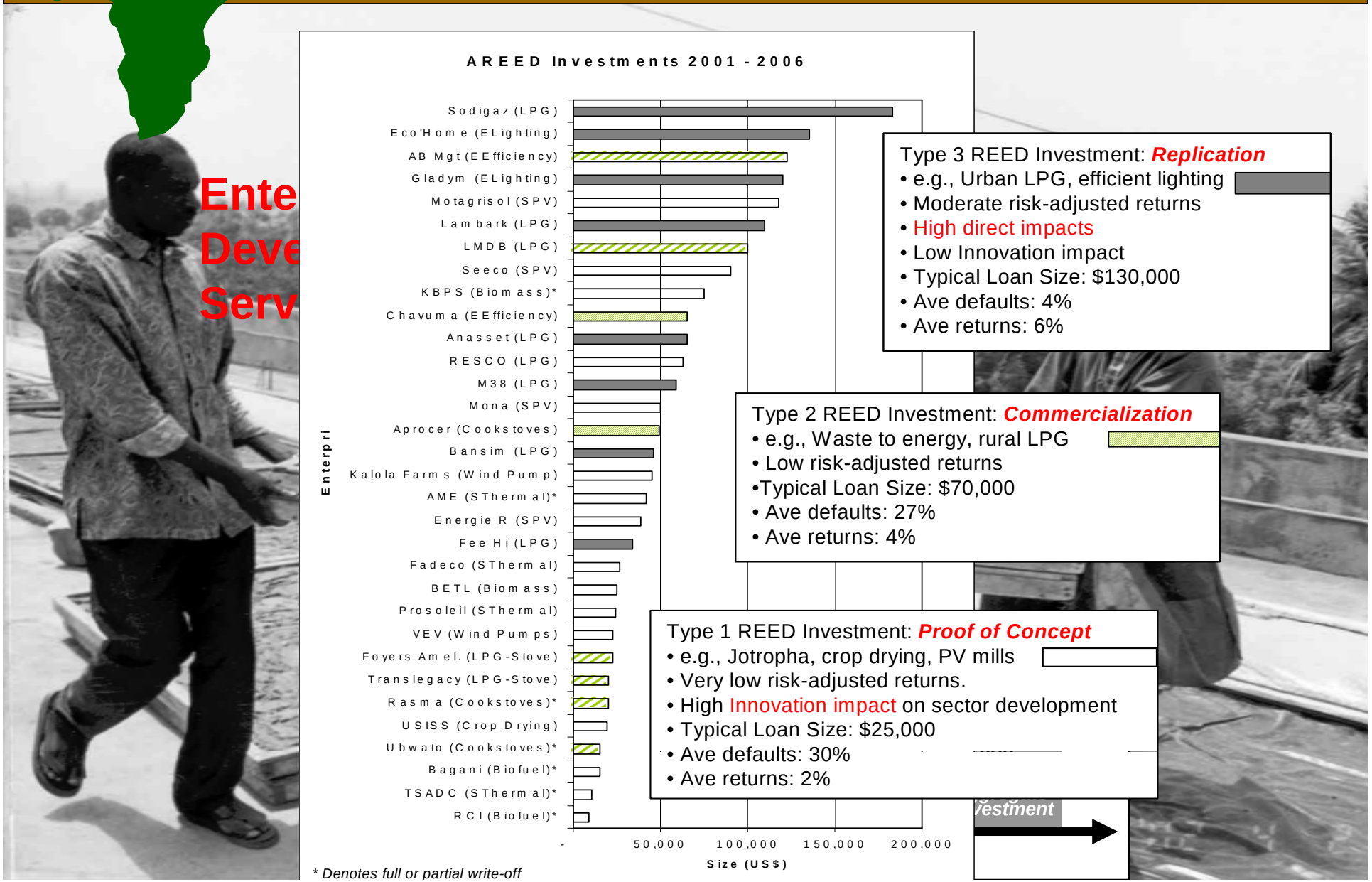
1. Identification and **consultation with local stakeholders**
2. Select most adapted financial scheme
3. Partner with local financial institutions
4. Preparation of a communication and marketing campaign
5. Capacity building for bankers and equipment providers

African Rural Energy Enterprise Development

AREED Finance Sector SME Engagement



Type 3 REED Investment: ***Replication***
- e.g., Urban LPG, efficient lighting
- Moderate risk-adjusted returns
- High direct impacts
- Low Innovation impact
- Typical Loan Size: $130,000
- Ave defaults: 4%
- Ave returns: 6%

Type 2 REED Investment: ***Commercialization***
- e.g., Waste to energy, rural LPG
- Low risk-adjusted returns
- Typical Loan Size: $70,000
- Ave defaults: 27%
- Ave returns: 4%

Type 1 REED Investment: ***Proof of Concept***
- e.g., Jotropha, crop drying, PV mills
- Very low risk-adjusted returns.
- High Innovation impact on sector development
- Typical Loan Size: $25,000
- Ave defaults: 30%
- Ave returns: 2%

vestment

** Denotes full or partial write-off*

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THANK YOU